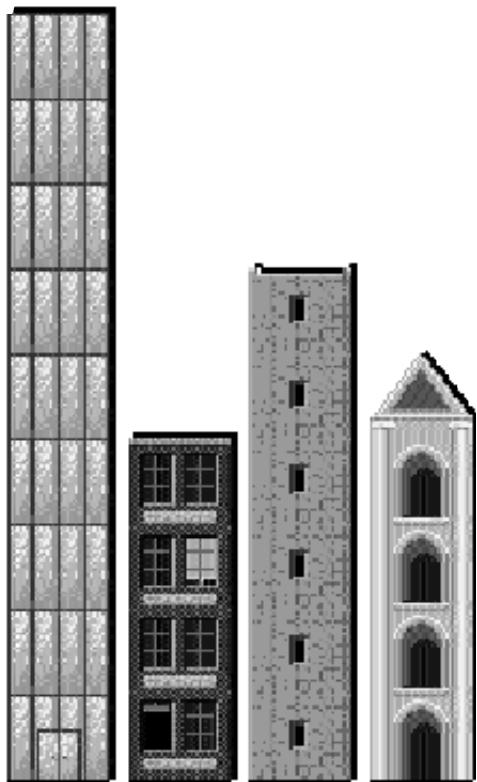


BUILDING PERSPECTIVE

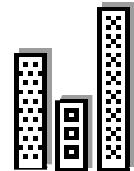
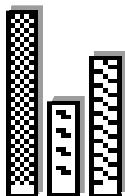


**TEACHER'S GUIDE
TI-73**

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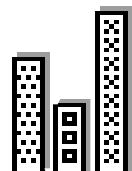
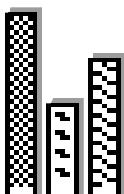
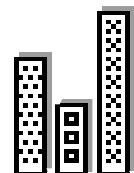
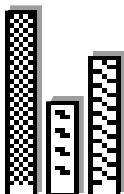


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INTRODUCTION

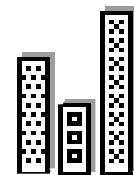
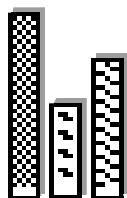
Building Perspective challenges students to view a group of patterned buildings from ground level and then predict how those buildings would appear if viewed from above.

The design emerged from manipulating Cuisenaire® rods. By standing the rods on end and looking at them from the side, it was interesting to note how some would hide others. Only by changing perspectives (i.e., viewing them from all four sides) could a person identify all of the rods and predict the overhead view. In *Building Perspective*, the rods have become “buildings,” with height of each building coded by a pattern in the same way as length is coded in Cuisenaire rods.

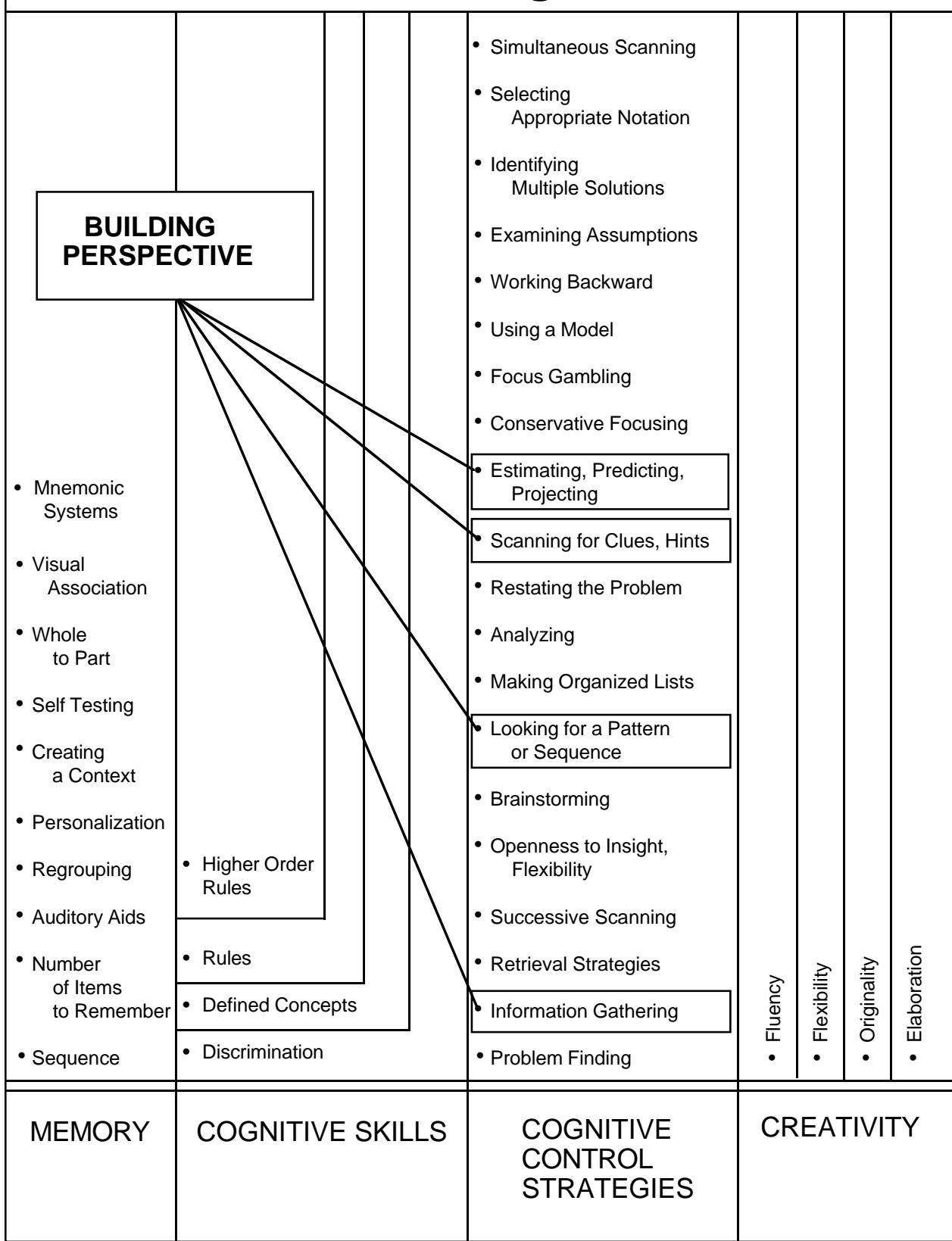
Some children may find it difficult to construct an abstract representation of each building array, therefore precomputer activities designed to give concrete practice in constructing the different arrays are provided in “Classroom Use” (see page 17). Some of these activities include using the Cuisenaire rods as a concrete introduction to the program.

Building Perspective is designed to provide practice in problem solving skills. Students will focus on four skills in particular:

- Scanning for clues and hints: They can view the target city from any of four sides. They choose the view they need to scan for clues and hints.
- Looking for a pattern or sequence: As they explore the views of the buildings from the sides, they detect patterns or sequences of the buildings.
- Information gathering: They confirm findings and collect new information as they view each additional side.
- Estimating, predicting, projecting: They consolidate the information they have gathered from the side views to predict how the target city will appear from a top view.



Problem Solving Skill Matrix



This matrix was developed under a Title IVC grant to Rochester, MN schools under the direction of Donna Stanger. The matrix is based on the works of Gagne, but also reflects Piaget, Guilford, Meeker, Bruner, Bloom and Torrance.

GETTING STARTED

HARDWARE AND SOFTWARE REQUIREMENTS

Make sure you have the following items:

- TI-GRAF LINK™ computer-to-calculator cable. If you do not have a TI-GRAF LINK cable, call your distributor, or order the cable online at the TI Accessory Store (www.ti.com/calc/docs/store.htm).
- Connecting TI-GRAF LINK cable adapter, 9-pin to 25-pin, if needed.
- Computer with Windows® 3.1x or Windows® 95/98 installed. (A Windows NT® version will soon be available.)
- *Building Perspective* software for the TI-73 on disk.
- A TI-73 calculator.

Things to Check Before You Begin

To make sure the batteries in your TI-73 are in good working condition, turn on your TI-73. If there is a low-battery message on the screen, turn the TI-73 off and follow the battery replacement procedure in Appendix C of your TI-73 Guidebook.

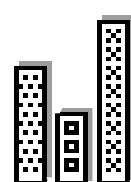
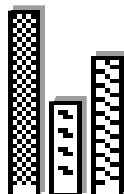
Before you load *Building Perspective* into your TI-73, verify that sufficient free space exists in your application memory space by entering 2nd MEM, 3:Check APPs. The first line indicates the number of free spaces available. Most applications will take up only one space. See the Memory is Full instructions in the Troubleshooting Section for details about deleting applications.

INSTALLING BUILDING PERSPECTIVE TO A TI-73

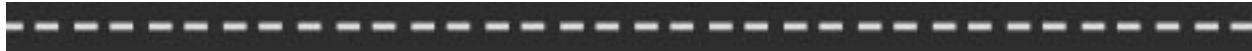
1. Make sure the TI-GRAF LINK cable is firmly connected to the calculator and the computer and the calculator is at the home screen.
2. Start Windows and close all desktop applications that may be running (another running application could interfere while *Building Perspective* is updating your TI-73).
3. Select Run from the File menu (Windows 3.1) or Run from the Start menu (Windows 95). In the Run dialog box, type C:\directoryname\ti73buil.exe (where directoryname is the directory to which you downloaded the Building Perspective file) and then click OK.
4. Follow the on-screen instructions to complete the installation. Eject the disk when installation is complete.

NOTE:
The TI-73 may briefly display a "Defragmenting" message. This simply means the calculator is preparing for downloading.

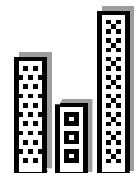
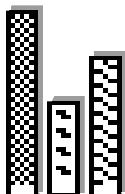
IMPORTANT: DO NOT interrupt the installation process. If any errors are encountered during the installation, follow the instructions. Error Recovery instructions are also described in the Troubleshooting Section of this guide.



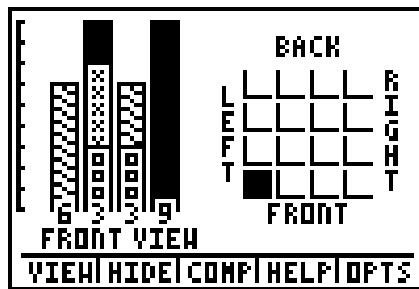
PROGRAM OBJECTIVES



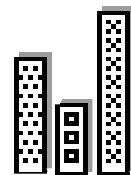
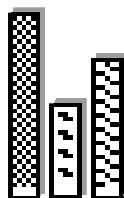
SKILLS:	Scanning for clues or hints Looking for a pattern or sequence Information gathering Estimating, predicting, projecting
GRADE LEVEL:	4 - Adult
READING LEVEL:	4th grade (for instructions)
TIME REQUIRED:	10 minutes
OBJECTIVES:	<ul style="list-style-type: none">• To help students experiment with pattern perspective along a horizontal plane• To help students develop visual thinking skills including spatial perception and spatial reasoning• To give students practice analyzing a problem and predicting an outcome



PROGRAM OVERVIEW



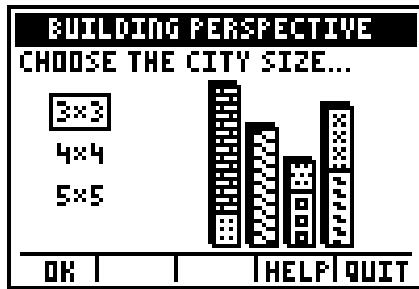
The objective of *Building Perspective* is to predict how a target city appears when viewed from above. The city is displayed on the left side of the screen and a city planning grid is displayed on the right. This city is composed of buildings that are located on every square of a grid that is 3x3, 4x4 or 5x5, depending on the students' choice. Students gather information by viewing the target city from any of four ground-level perspectives: front, right, back or left. Since the buildings are of varying heights, some of them may be entirely hidden by others in some or all of these four views. To get a better view of a concealed building, students can move among the different views or use the Hide option to temporarily hide one building at a time. As students discover the location of buildings, they can position them on the city planning grid. At any time, students can choose to compare their solution city with the target city. If their prediction is correct, students are congratulated. If not, they can continue working on the solution or compare the two cities from any of the four ground-level perspectives or from the top view.



PROGRAM DESCRIPTION



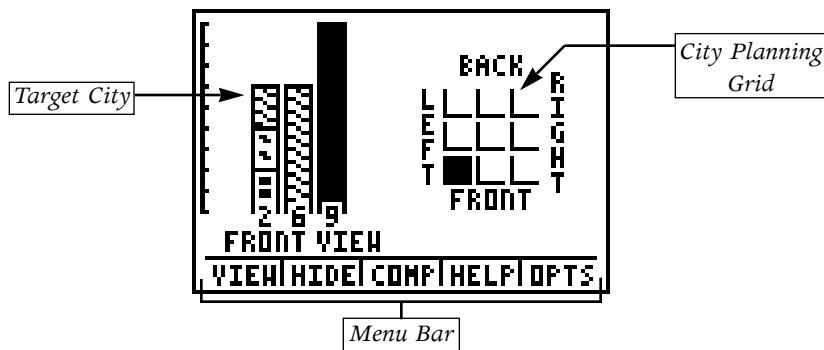
When students begin, the program's credit screen is displayed for a moment, followed by the main menu, shown below:



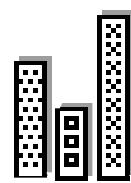
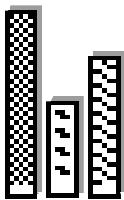
Students choose from the following to select the size of the target city, get help or quit the program.

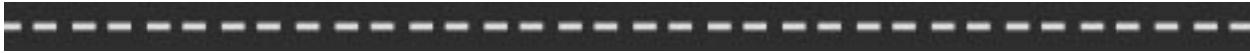
- 3x3** begins the easiest level of the program, with a grid that is three buildings across and three buildings deep.
- 4x4** begins a more difficult level, with a grid that is four buildings across and four buildings deep.
- 5x5** begins the most challenging level of the program, with a grid that is five buildings across and five buildings deep.
- OK** selects the city size that has the selection box around it. In the example above, if OK were selected, a 3x3 game would begin.
- Help** provides directions.
- Quit** exits the program.

After a size has been selected, the Planning Screen appears. In this case a 3x3 grid was selected:



The Planning Screen is divided into three main sections: the Target City (the goal for students), the City Planning Grid (the solution matrix students use to predict) and the menu bar.

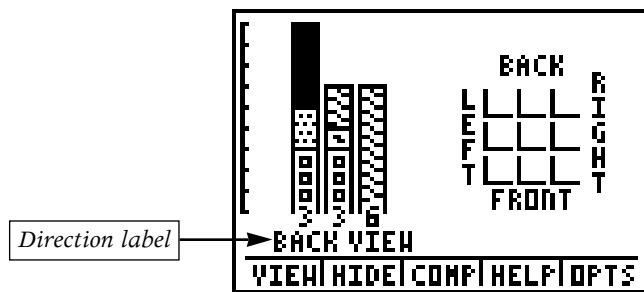




TARGET CITY

In the target city there are buildings from one to nine stories high, each height corresponding to a specific pattern.

The program automatically presents the Front View of the city first. Students can select other views by choosing **VIEW** from the menu bar and selecting a view: **FRNT**, **LEFT**, **BACK**, **RGHT**. After a view is selected, a direction label will appear below the target city.

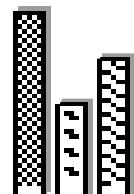
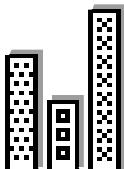
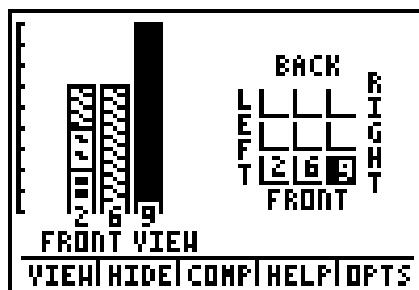


This is an example of a Back view of the target city.

CITY PLANNING GRID

The city planning grid represents a top view of the city. The four sides of the city are labeled: **FRONT**, **LEFT**, **BACK** and **RIGHT**. Students use the arrow keys on the calculator to navigate through the planning grid and the number keys to place buildings on the empty plots in the grid. The **HIDE** option can be used to temporarily hide a building and can be selected from the menu bar. One building lies on each grass plot.

Based on the city below, students can conclude that buildings 2, 6 and 9 are located in **FRONT** in that order, from left to right. Consequently, they can place these buildings on the planning grid. They may do so by navigating to each plot with the arrow keys and pressing the appropriately numbered keys on the calculator. The grid would appear as shown below:



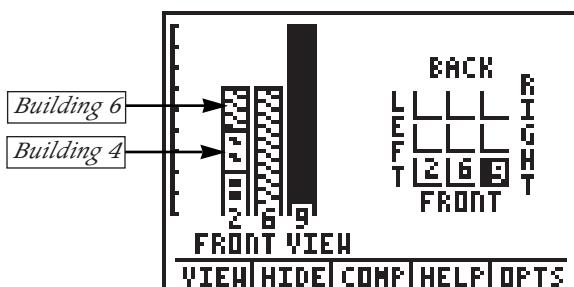


To correct a mistake on the city planning grid students can use the **CLEAR** button on the calculator by moving the cursor over the box they would like to change. Pressing another number while over the same box in the grid will change the previous building size entered.

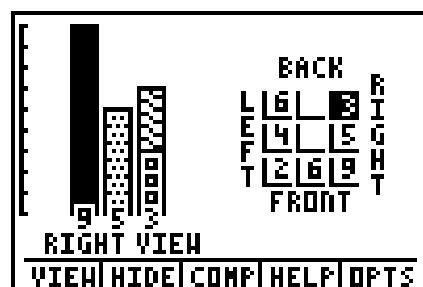
MENU BAR OPTIONS

VIEW OPTIONS (FRONT, LEFT, BACK AND RIGHT)

By clicking on **VIEW**, students can select other views of the target city to determine the location of other buildings. Based on the Right View shown below, students can determine that buildings 9, 5 and 3 lie on the **RIGHT** side. Combining the information derived from the Front and Right Views, students can determine that building 6 lies on the corner of the **LEFT** and **BACK** and by just looking at the **FRONT** view alone, students can also determine that building 4 lies in the middle of the **LEFT** side. The planning grid would appear as shown below:

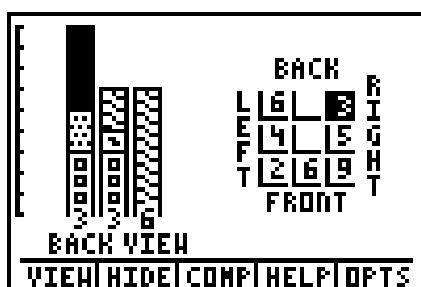


FRONT View of buildings

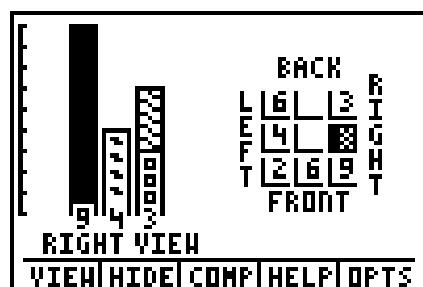


RIGHT View of the buildings

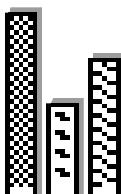
Students could complete the grid by choosing the Back View (shown below, left) and filling in the buildings. They can also complete the grid by temporarily hiding building 5 from the Right View, (building 5 is hidden in the Right View shown below, right), to see the building in the center plot (building 4) and then hide building 3 on the Right as well to see the building in the center of the Back row.



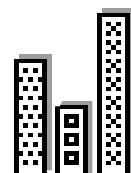
BACK View of the buildings

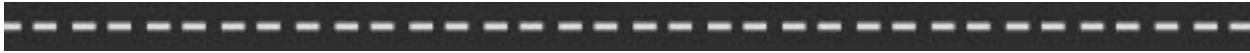


RIGHT View with a hidden building



Building Perspective





HIDE OPTION

To temporarily hide building 5, (as shown on the bottom of page 11), students select **HIDE** from the menu bar while the cursor is over the plot in the planning grid that corresponds to the building in the target city. To restore the building, students can select the **HIDE** option again from the menu bar while the cursor is over the previously hidden building. They can also arrow over with the cursor to another location on the grid that they want to hide and then select **HIDE** again from the menu bar. This will restore the first hidden building and then hide the new one that the cursor is over.

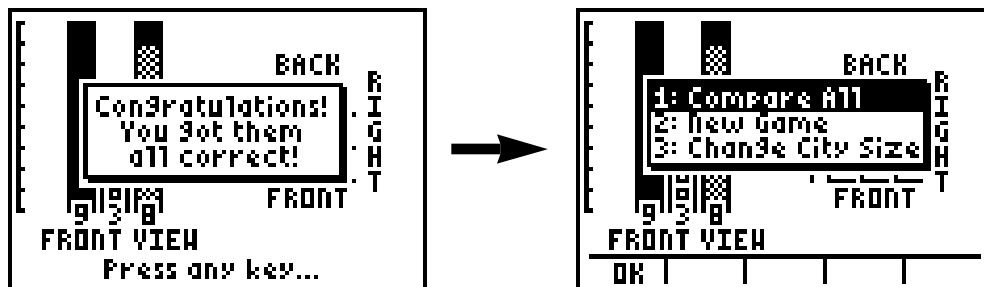
IMPORTANT: Only one building can be hidden at a time.

This option is particularly useful to reveal the height of a building located in the center of the grid, where it may be concealed by taller buildings surrounding it. It becomes more necessary as the size of the city increases.

COMP OPTION (COMPARING VIEWS)

At any time when students are ready to compare their prediction, they may select **COMP** from the menu bar.

- If their solution is correct, students will receive a congratulatory message box telling them they planned the city correctly.

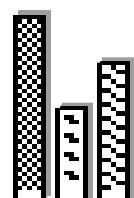
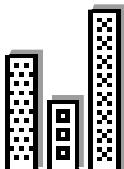


Once this screen has been dismissed the student will be able to choose from:

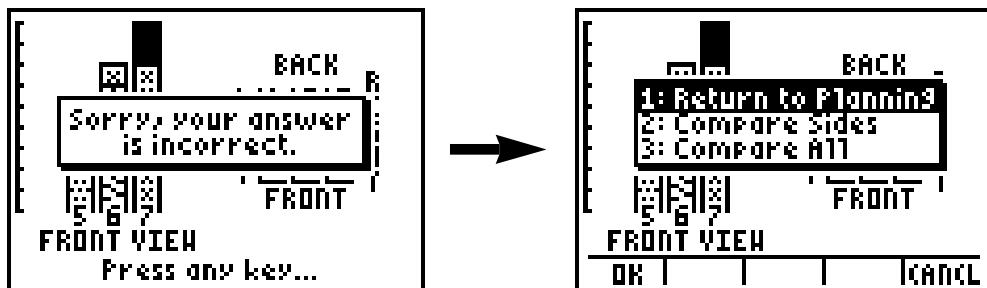
Compare All allows students to compare any side or the top of the target city with the same view of the solution city

New Game gives students a new game using the same city size

Change City Size allows students to choose a new city size



- If their solution is incorrect, students will receive a message stating their solution is incorrect.

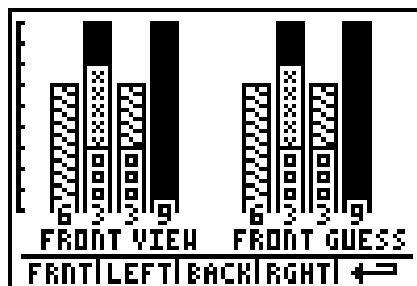


Once this screen has been dismissed the student will be able to choose from:

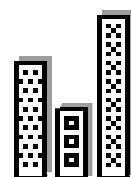
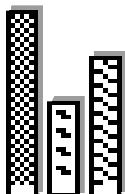
- | | |
|---------------------------|---|
| Return to Planning | returns students to the Planning screen |
| Compare Sides | allows students to compare any side (Front, Right, Back, Left) of the target city with the same side of the solution city |
| Compare All | allows students to compare any side or the top of the target city with the same view of the solution city |

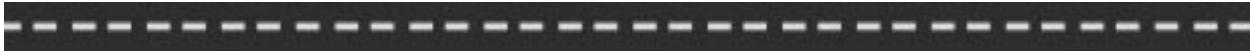
Compare Sides

Compare Sides allows students to compare any side (Front, Right, Back, Left) of the target city with the same side of the solution city. When this option is selected a screen like the one below appears:



In this screen, the target city appears on the left side of the screen and the students' solution city on the right. Both are shown from a street-level perspective. Students can select either FRNT, LEFT, BACK, or RGHT from the menu bar to compare different views. Selecting the Return arrow from the menu bar will return them to the Planning Screen.





Compare All

Compare All allows students to compare any side or the top of the target city with the same view of the solution city. When this option is selected, the top view comparison like the one below appears.

TOP VIEW	TOP GUESS
5 3 3 4	5 3 3 4
9 3 1 2	9 3 1 2
4 7 9 1	4 7 9 1
1 6 7 5	1 6 7 5

SIDE | | | ←

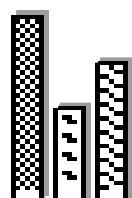
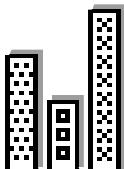
In this screen, the target city appears on the left side of the screen and the students' solution city on the right. Sometimes the answers are not all correct, as shown in the screen below.

TOP VIEW	TOP GUESS
- -L	9 9 L
- -L	-8 L
2 0 4	2 0 4

SIDE | | | ←

In this screen you will see dashes and blank grid plots on the left under "Top View" and blank plots on the right under "Top Guess." The dashes denote the heights of buildings that were incorrectly guessed by the students. The blank plots represent the buildings where no data was entered by the students. These are here to cover the correct answers.

From the Top view, students can select **SIDE** from the menu bar. They can then choose **FRNT**, **LEFT**, **BACK**, or **RGHT** to compare different side views. Selecting the Return arrow from the menu bar will return them to the Planning Screen.





Demolishing Buildings

After the students have finished comparing the sides and top view of the solution, they can return to the Planning Screen by selecting the Return arrow from the menu bar.

If any of their buildings in the solution city are incorrect, they will be offered the option to demolish incorrect buildings.

They can select No to return to the Planning Screen with the city planning grid unchanged. Or they can select Yes to clear incorrect buildings from the city planning grid.

Free Buildings

If students select Compare All more than once in the same session, they will be offered a free building. A free building will be offered each additional time the student selects Compare All after this point. If there is only one building left to find, the program will not ask the students if they want a free building.

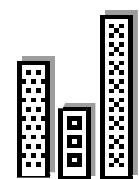
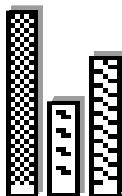
If students choose not to get a free building, they can select No. They will then be asked if they want to demolish incorrect buildings before returning to the Planning Screen.

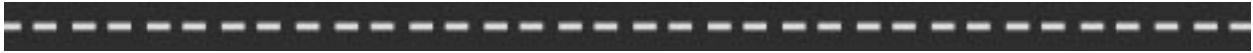
If students choose to get a free building, they can select Yes. The Planning Screen will reappear with all incorrect buildings automatically demolished and the free building flashing in its appropriate plot on the city planning grid. Once students press any key to continue on, the building will stop flashing.

HELP OPTION

Students may ask for help at any point during the program in two ways. They can select the **HELP** option from the menu bar or they can select **Directions** from the **OPTS** menu in the menu bar.

Selecting either **HELP** or **Directions** will bring the students to the Instruction screens which offer a brief overview of the game. To navigate through the help screens, use **NEXT** and **PREV** on the menu bar of the help screens or use the Up and Down arrows on the calculator. Selecting **DONE** from the menu bar will bring the students back to where they were before they selected **HELP/Directions**.



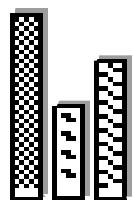
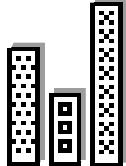


QUIT OPTION

Students may quit the program at any point during the game in one of four ways:

1. Selecting QUIT from the menu bar on the main screen.
2. Selecting QUIT from the OPTS menu accessed from within a game.
3. Pressing the [2nd] then the [QUIT] buttons on the calculator.
4. Pressing the [ON] button on the calculator.

Choosing to quit at any point in the game will bring up a message box asking the students: "Are you sure you want to leave Building Perspective?" Selecting NO will bring the student back to the game. Selecting YES will quit the program.



CLASSROOM USE

BEFORE USING THE PROGRAM

Before letting students use *Building Perspective* on their own, you may wish to present the four possible views (Front, Right, Back, Left) of the buildings in a more concrete manner. Listed below are three ways to do this.

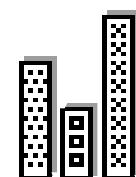
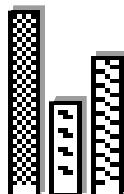
1. Cuisenaire® Rods. Use color-coded Cuisenaire rods, which differ from the “buildings” in only two ways: the colors of the Cuisenaire rods and the buildings are different, and Cuisenaire rods include a tenth (longest) rod.

Although it is possible to create a square Pegboard with up to 25 holes (5 rows by 5 columns) to hold the rods, a quicker method would be to use either clay or styrofoam as a base. Using a physical model and shifting the perspective is especially helpful for younger students. Fourth graders and above who have attained the sophistication of abstract thinking may be better challenged by using paper and pencil to draw their own models of the array possibilities.

2. Role Playing. Try introducing students to the program by having them “act out” the role of various sized buildings. First draw a 3x3 array on a piece of paper (or use chalk or masking tape); make the squares big enough for students to stand inside each position of the array. Prepare a set of 8 1/2 x 11 sheets of colored paper—a few sheets in each of nine colors. Label each sheet with a number that will correspond to that particular color (e.g., 1 for blue sheets, 2 for red sheets, etc.). Mix up the sheets and randomly hand them out to nine students who will play the roles of the buildings, letting them choose any place to stand in the 3x3 array.

Students face the class and hold the sheets before them at levels approximating their building size. Place a chair in front of the array. Select a student from the class to sit in the chair and guess the positions of the “buildings” (no peeking around the sides!). Have the student in the chair change the placement of the chair at your command, moving from front to right to back to left. Each time the student wants a different perspective, have the students in the array turn towards that student.

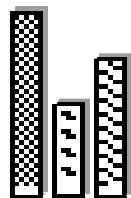
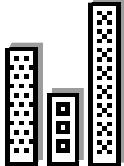
As the student in the chair changes positions, ask him or her to give you the positions of the “buildings” in the array by using student names. Write this information on the board for all the class to see. If the student in the chair cannot guess the solution, have the class help out. It may be useful to remove one of the “buildings” to see behind it.



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- 3. Drawing Models. Another method of introducing the program is to have students draw ground-level views of everyday surroundings (i.e., downtown skylines, neighborhood homes/apartments). Then, have them draw the same picture—only this time from another angle (left, right, back). An extension of this exercise would be to have them remove one of the elements of the picture to show what's behind it.

HELPING STUDENTS GET STARTED

- 1. Have a group of students create a poster illustrating the different sized buildings, identifying them by color, number and architectural style. Hang it near the computer as a reference chart for students while they use the program.
- 2. Have students begin the program with a 3x3 array. Have them move through all four choices: Front, Right, Back, Left. Students should become more familiar with the program before attempting the more complex 4x4 and 5x5 arrays.
- 3. Demonstrate the use of Hide Building to show them how they can see behind taller buildings. This is not as important in 3x3 arrays, but when students start using the more complex 4x4 and 5x5 arrays, it becomes a necessary option.
- 4. Younger students may need to set up the rods in clay (or styrofoam) as they identify buildings, keeping a concrete record of their guesses. Older students beginning to use the more complex arrays may need to use concrete models as well.
- 5. Students may use the program either individually, with a partner, or in small groups. If the groups are small enough, all students will have an opportunity to voice their predictions.



TROUBLESHOOTING

ERROR RECOVERY INSTRUCTIONS FOR THE TI-73

Communication Error

This error indicates the Flash Installer is unable to communicate with the TI-73. The problem is usually associated with the TI-GRAFH LINK™ cable and its connection to the TI-73 and/or to the computer. Make sure the cable is firmly pushed into the calculator and the computer.

If this does not correct the problem, try a different TI-GRAFH LINK cable and reboot your computer. If you continue to get this error, please contact 1-800-TI-CARES (see Technical Support).

Memory is Full

This download error appears when the TI-73 contains one to four applications that occupy the available 64K of space. In order to make room for another application, you must delete one from the TI-73. Before deleting an application from the TI-73, you can back it up by using the Windows Backup App command in TI-GRAFH LINK for the TI-73. Once saved, you can reload it to the TI-73 later using TI-GRAFH LINK.

Expiration Date Reached

The application has reached its expiration date and can no longer be used. Please contact 1-800-TI-CARES (see Technical Support).

Miscellaneous Error Received

Write down the error code displayed in the dialog box and contact 1-800-TI-CARES (see Technical Support).

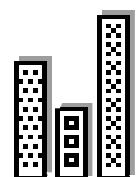
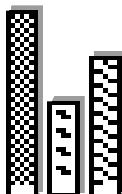
Checksum Error

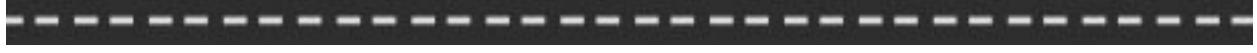
Exit the installer and try it again. If this problem persists, contact 1-800-TI-CARES (see Technical Support).

Low Battery Condition

It's a good idea to make sure that you have sufficient battery power prior to attempting a download. Low battery indication is shown on the initial screen. If you receive this error during an installation, change the batteries before trying again.

MISCELLANEOUS





In order to obtain new or upgraded software for your TI-73, you may need to provide your current software version and/or the serial number of your unit. It is also good to know your version number in case you have difficulties with your TI-73 and need to contact technical support. Knowing the software version may make it easier to diagnose the problem.

Knowing the available number of application spaces in advance helps you better manage your application downloads.

Verify Maintenance Upgrade Version

On the TI-73, enter 2nd, Mem, 1:About. The version number has the format x.yyyy.

Verify Application Version number

On the TI-73, select APPS. Select the appropriate application and press ENTER. The version number of the application appears on the initial screen.

Verify Serial Number

On the TI-73, enter 2nd, Mem, 1:About. The serial number appears on the line beneath the product ID number.

Check Amount of Flash Application Free Space

On the TI-73, select 2nd, MEM, 3:Check APPs. The number to the right of "Spaces Free:" indicates the number of spaces available for applications. Each application requires one space. There is a maximum of four free spaces.

TECHNICAL SUPPORT

For questions concerning the installation of *Building Perspective* on your TI-73 or for questions concerning the TI-73 calculator, contact Texas Instruments Customer Support.

Customers in the U.S., Canada, Puerto Rico and the Virgin Islands

Send us e-mail at ti-cares@ti.com.

Call us at 1-800-TI-CARES (1-800-842-2737)

Customers outside the U.S., Canada, Puerto Rico and the Virgin Islands

Send us e-mail at ti-cares@ti.com.

